the resource allocation mode change request may comprise D2D service quality of service (QoS) parameters, for example, QoS class identifier (QCI). The base station may perform resource allocation update and send a resource allocation message to UE**1**. The resource allocation message may comprise slot numbers that UE**1** is scheduled or not scheduled in D2D and/or cellular communication. For example, in LTE/LTE-A, the resource allocation message may comprise the subframe numbers that UE**1** is scheduled or not scheduled in D2D and/or cellular communication. The resource allocation message may comprise DRX parameters, for example, DRX offset and DRX cycle which indicate when DRX cycle starts and may end. When UE**1** receives the resource allocation message, UE**1** starts to use mode **1** or mode **3** for cellular and D2D communications.

[0036] FIG. **5** depicts another example message sequence chart showing a possible signaling flow between a user equipment and a base station.

[0037] In some example embodiments, some existing signaling format may be used for a UE to report the power required for D2D transmission to a base station. For example, in LTE/LTE-A, UE uses power headroom report (PHR) to assist the base station to perform power control and scheduling, for example, base station may utilize the PHR report to determine the UE's transmission data rate for cellular communication, transmission start time, transmission interval, and/or the like. Reference can be made to 3GPP TS 36.321 V11.3.0 (2013-03) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Medium Access Control (MAC) protocol specification (Release 11). As illustrated in FIG. **5**, UE**1** reports to a base station the power required for D2D communication in a PHR report. Based at least in part on the power required for D2D communication received in the PHR report, base station decides whether UE**1** needs to switch mode. If base station decided to switch mode for UE**1**, it may issue a command to UE**1** with decided power. For example, it may issue a mode switch command or another command such as scheduling decision/restriction or DRX/DTX configuration to UE**1**. For example, UE**1** is operating in mode **2** and sends the power required for D2D communication in PHR report to base station. If base station determines that the power for cellular communication plus the power for D2D communication exceeds a certain threshold, it may decide to switch to mode **1** and issues a command to UE**1**. Moreover, the command may include the mode to be switched to if there are more than two modes available for the selection of switching. Referring to the previous example, the base station may select between mode **1** and mode **3** when deciding which mode to switch to. Furthermore, the mode switch command may include scheduling results, for example, time division multiplex (TDM) pattern such as when the cellular and D2D communications are scheduled.

[0038] It is noted that the base station illustrated in FIG. **5** is described for purposes of example, UE**1** and UE**2** may be controlled by two different base stations according to the present invention. It is also noted that the signaling flows illustrated in FIG. **3**-**5** are described for purposes of example, the D2D communications may be operated among more than two users according to the present invention.

[0039] FIG. **6** depicts an example message format for extended power headroom reporting. As illustrated in FIG. **6**, in the first Octet, the last reserved bit, for example, bit I_{D2D} may be used to indicate whether D2D power is included. If this bit is set, for example, the bit is set to 1, then at the end of the PHR, power consumed on D2D communication, P_{D2D}, is reported.

[0040] FIG. **7** depicts an example process for resource allocation for D2D and cellular communications. The example process may be performed by or in an apparatus in accordance with some example embodiments.

[0041] At **701**, the apparatus detects that a mode change is required. In some example embodiments, the apparatus detects that a mode change is required when some criteria is satisfied. For example, as described for FIG. **3** and FIG. **4**, the apparatus operating in mode **2** may detect that a change to mode **1** is required when the accumulated power for cellular and D2D communications exceeds a certain threshold. In some other example embodiments, the apparatus detects that a mode change is required when it receives a mode switch command from a base station, for example, as described for FIG. **5**.

[0042] At **702**, the apparatus selects a mode for resource allocation in response to the detection that a mode change is required. In some example embodiments, the mode is selected by the apparatus from a plurality of modes. For example, as described for FIG. **3** and FIG. **4**, when the apparatus operating in mode **2** detects a change to mode **1** is required, it may select mode **1** for cellular and D2D communications. In some other embodiments, the mode is selected based on a command received by the apparatus. For example, the mode is selected based on a mode switch command or another command such as scheduling decision/restriction or DRX/DTX configuration received by the apparatus. Referring to the previous example in FIG. **5**, when the apparatus operating in mode **2** receives a mode switch command from the base station, it selects mode **1** for cellular and D2D communications.

[0043] It is noted that the functionalities of base station for D2D resource control as illustrated in FIG. **3**-**7** are described for purposes of example, other entities, for example, DRSF, may also be used as the coordinating entity for D2D resource control according to the present invention.

[0044] FIG. **8** illustrates a block diagram of an apparatus **10**, which can be configured as user equipment in accordance with some example embodiments.

[0045] The apparatus **10** may include at least one antenna **12** in communication with a transmitter **14** and a receiver **16**. Alternatively transmit and receive antennas may be separate.

[0046] The apparatus **10** may also include a processor **20** configured to provide signals to and receive signals from the transmitter and receiver, respectively, and to control the functioning of the apparatus. Processor **20** may be configured to control the functioning of the transmitter and receiver by effecting control signaling via electrical leads to the transmitter and receiver. Likewise processor **20** may be configured to control other elements of apparatus **10** by effecting control signaling via electrical leads connecting processor **20** to the other elements, such as for example a display or a memory. The processor **20** may, for example, be embodied as various means including circuitry, at least one processing core, one or more microprocessors with accompanying digital signal processor(s), one or more processor(s) without an accompanying digital signal processor, one or more coprocessors, one or more multi-core processors, one or more controllers, processing circuitry, one or more computers, various other processing elements including integrated circuits such as, for example, an application specific integrated circuit, ASIC, or